

AMENDMENTS TO THE CLAIMS

1-24. (Canceled)

25. (Currently amended) A small-diameter probe for use with an introducer in a patient having a vessel carrying blood to ascertain characteristics of the blood comprising a cannula having proximal and distal extremities ~~and a diameter ranging from 0.010 to 0.035 inch,~~ the distal extremity of the cannula being adapted to be inserted into the vessel of the patient, an oxygen and carbon dioxide sensor assembly disposed in the distal extremity of the cannula for providing an electrical signal when the cannula is disposed in the blood and a connector carried by the proximal extremity of the cannula whereby the distal extremity of the cannula is adapted for slidable travel through the introducer when inserting the cannula into the vessel, the cannula and connector having a size which permits the introducer to be slid off of the proximal extremity of the cannula and the connector after the distal extremity of the cannula has been inserted into the vessel and ~~whereby~~ wherein the sensor assembly comprises ~~a tube;~~ at least one insulating layer surrounding a proximal working electrode of a proximal sensor and at least one insulating layer surrounding a distal working electrode of a distal sensor, the proximal sensor comprising ~~an a proximal reference electrode and the distal sensor comprises a distal reference electrode,~~ wherein both of said reference electrodes extend ~~that extends~~ at least partially around the tube at least one insulating layer and at least one conductor coupled to the distal sensor and extending ~~wherein the distal working electrode, or a conductor in electrical contact with and extending from the distal working electrode, extends through the tube at least one insulating layer surrounding the proximal working electrode.~~

26. (Original) The probe of Claim 25 in combination with the introducer.

27. (Previously presented) The probe of Claim 25 wherein the introducer is a needle.

28. (Previously presented) The probe of Claim 25 wherein the connector has a cylindrical portion and has an electrical contact extending around at least a portion of the cylindrical portion, a conductor extending from the electrical contact to the oxygen and carbon dioxide sensor assembly.

29. (Previously presented) The probe of Claim 28 wherein the electrical contact is seated flush with the cylindrical portion so as to provide the connector with a substantially smooth cylindrical surface.

30-55. (Canceled)

56. (Previously presented) The probe of Claim 25 further comprising a flex circuit extending through at least a portion of the cannula, the flex circuit having proximal and distal portions with first and second electrodes formed on the distal portion and first and second conductors extending from the proximal portion to the first and second electrodes, the first and second electrodes and the first and second conductors forming at least part of the oxygen and carbon dioxide sensor assembly.

57. (Previously presented) The probe of Claim 56 further comprising an electrolyte solution disposed in the distal extremity of the cannula in the vicinity of the first and second electrodes.

58. (Previously presented) The probe of Claim 57 wherein the cannula is provided with a sealed chamber in which the first and second electrodes are located, the electrolyte solution being disposed in the sealed chamber.

59. (Previously presented) The probe of Claim 58 wherein the cannula is provided with an additional sealed chamber in which third and fourth electrodes are located, the electrolyte solution being disposed in the additional sealed chamber.

60. (Previously presented) The probe of Claim 56 wherein at least part of the proximal portion of the flex circuit serves as the connector.

61. (Previously presented) The probe of Claim 56 wherein the flex circuit has an exposed surface, the first and second electrodes each being a pad formed on the exposed surface.

62. (Previously presented) The probe of Claim 56 further comprising adhesive disposed within the cannula for securing the flex circuit within the cannula.

63. (Previously presented) The probe of Claim 25 wherein the cannula is gas permeable in the vicinity of the oxygen and carbon dioxide sensor assembly.

64. (Previously presented) The probe of Claim 63 wherein the entire cannula is made of a gas permeable material.

65. (Previously presented) The probe of Claim 64 wherein the gas permeable material is polymethylpentene.

66. (Withdrawn) The probe of Claim 25 wherein the connector has a cylindrical portion and an electrical contact extending around at least a portion of the cylindrical portion, a conductor extending through the probe for electrically coupling the oxygen and carbon dioxide

sensor assembly with the electrical contact, the electrical contact being seated flush with the cylindrical portion so as to provide the connector with a substantially smooth cylindrical surface.

67. (Withdrawn) The probe of Claim 66 further comprising an additional electrical contact extending around at least a portion of the cylindrical portion and spaced apart from the first-named electrical contact.

68. (Previously presented) The probe of Claim 25 in combination with a display module having a display connector for mating with the connector of the probe, the connector and the display connector permitting connection and disconnection between the probe and the display module.

69. (Previously presented) The probe of Claim 68 further comprising a band connected to the display module for securing the display module to the wrist of the patient.

70. (Currently amended) A probe for use with an introducer in a patient having a vessel carrying blood to ascertain characteristics of the blood comprising a cannula having proximal and distal extremities, the distal extremity of the cannula being adapted to be inserted into the vessel of the patient, an oxygen and carbon dioxide sensor assembly disposed in the distal extremity of the cannula for providing an electrical signal when the cannula is disposed in the blood, the cannula being made of a gas-permeable material polymethylpentene in the vicinity of the oxygen and carbon dioxide sensor assembly, and a connector carried by the proximal extremity of the cannula whereby the distal extremity of the cannula is adapted for slidable travel through the introducer when inserting the cannula into the vessel, the cannula and connector having a size which permits the introducer to be slid off of the proximal extremity of the cannula and the connector after the distal extremity of the cannula has been inserted into the vessel and whereby the oxygen and carbon dioxide sensor assembly is mounted in the distal extremity of the cannula and comprises ~~a tube~~ an electrically insulating conduit having a distal portion, a first working electrode, a second working electrode, a first reference electrode and a second reference electrode, the second reference electrode extending at least partially around the electrically insulating conduit, first, ~~and second,~~ third, and fourth conductors extending from the proximal extremity of the cannula to the oxygen and carbon dioxide sensor assembly, wherein the first conductor is electrically coupled to the first working electrode and the second conductor extends through the ~~tube~~ electrically insulating conduit and is coupled to the second working electrode, the third conductor is electrically coupled to the first reference electrode, and the fourth

conductor is electrically coupled to the second reference electrode, the tube electrically insulating conduit serving as a support for the first reference electrode and as a conduit for the ~~second~~ fourth conductor.

71. (Previously presented) The probe of Claim 70 further comprising a flex circuit extending through at least a portion of the cannula, the flex circuit having proximal and distal portions with first and second electrodes formed on the distal portion and first and second conductors extending from the proximal portion to the first and second electrodes, the first and second electrodes and the first and second conductors forming at least part of the oxygen and carbon dioxide sensor assembly.

72. (Previously presented) The probe of Claim 71 wherein at least part of the proximal portion of the flex circuit serves as the connector.

73. (Previously presented) The probe of Claim 71 wherein the flex circuit has an exposed surface, the first and second electrodes each being a pad formed on the exposed surface.

74. (New) The probe of Claim 25 where the insulating layer is a tube.

75. (New) The probe of Claim 25 where the at least one insulating layer comprises at least two insulating layers.

76. (New) The probe of Claim 25 where at least one of the working electrodes extends at least partially around at least one insulating layer.

77. (New) The probe of Claim 70 where the insulating conduit is a tube.

78. (New) The probe of Claim 70 where the first working electrode extends at least partially around the tube.

79. (New) The probe of Claim 78 where the first reference electrode extends at least partially around the tube.